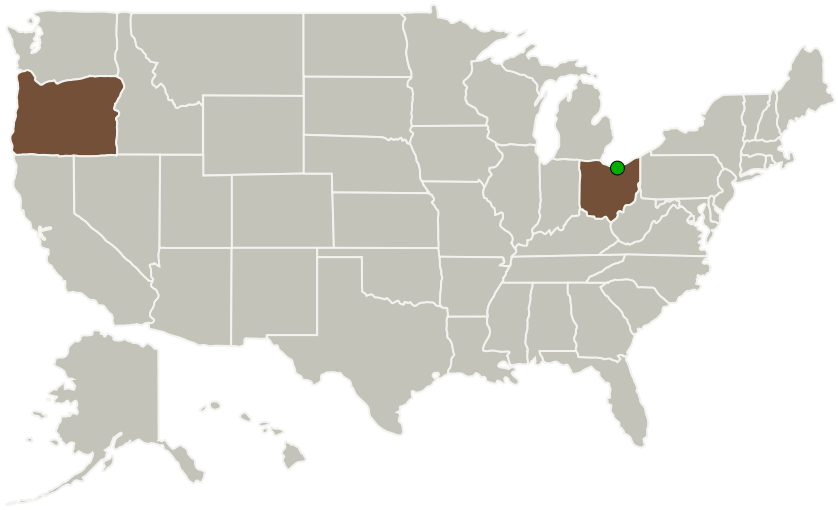
Advanced Capabilities Medical Suction Device, Phase I

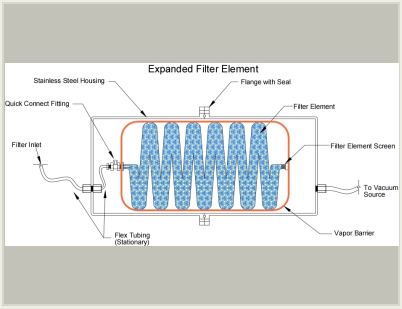
Completed Technology Project (2013 - 2013)

Project Introduction

A compact microgravity and hypogravity compatible vacuum device is proposed to provide medical suction and containment of extracted fluids. The proposed aspirator will draw up to 40 L/min of air and produce a nominal vacuum of 500-mm Hg, which is comparable to commercially available medical aspirators. The unit will also provide a means for separation and containment of up to 1000 mL of aspirated fluids. Waste material separation will be accomplished by a reticulated foam trap that will utilize hydrophilic adsorbent materials to sequester liquids within the reticulated foam structure. The aspirator assembly will also include a sub-micron filter to prevent aerosol from escaping to the spacecraft cabin. During the Phase I research, an efficient trap will be designed and tested using a commercial off the shelf (COTS) vacuum pump. Additional trap features will be investigated including collapsible walls to minimize storage space and chemical resistance to enable suction of corrosive and/or toxic materials. Phase II research will focus on improving overall ESM and incorporating features such as a trap fill level indicator, an emergency shutoff in case of liquid breakthrough, and an alarm indicating a blocked airway, which will improve microgravity performance.

Primary U.S. Work Locations and Key Partners





Advanced Capabilities Medical Suction Device

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Organizations Performing Work	Role	Type	Location
UMPQUA Research Company	Lead Organization	Industry	Myrtle Creek, Oregon
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations	
Ohio	Oregon

Project Transitions

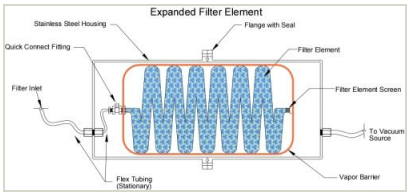
May 2013: Project Start

November 2013: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140387)*

Images



Project Image
Advanced Capabilities Medical Suction Device
(https://techport.nasa.gov/image/132824)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
UMPQUA Research Company

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
William F Michalek

Co-Investigator:
William Michalek

Advanced Capabilities Medical Suction Device, Phase I

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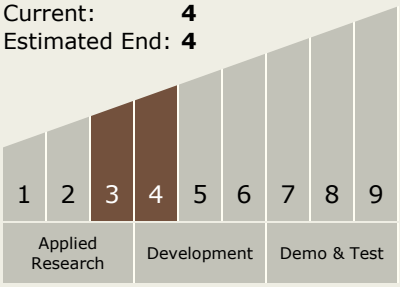
Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.3 Human Health and Performance
    - TX06.3.1 Medical Diagnosis and Prognosis

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System